

SWEN90016

Software Processes & Project Management

Harry Drakos

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The University of Melbourne

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2019 – Semester 1

Lecture 1

Your Subject Support Staff

Lecturer: Shanika Karuansekera
(Subject Coordinator)



Lecturer: Harry Drakos



Tutors



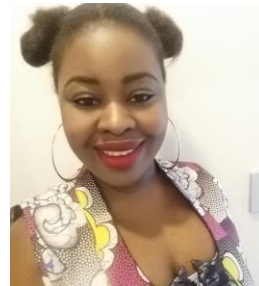
Marion Zalk
Head Tutor



Rajesh Sundaram



Doc Wallace



Esther Rotimi



Saksham
Agrawal



Nathaniel
Carpenter



Chong
Kuok

Harry Drakos



Academic – Melbourne lecturer

Professional Experience

- Independent Consultant – Commercial & Project Management
 - Industries & Clients: Commonwealth Government, Large Banks, Telco's, Pharmaceutical, Superannuation and Not for Profits
- 15 Years at NAB
 - Senior roles across: Program Management, Project Management, Procurement, Technology Transformation / Strategy and Applications / Infrastructure delivery
- 15 Years prior experience including:
 - CIO roles, Large and Small scale IT projects, IT Management and many years ago software development

AIM

The aim of this subject is to introduce students to the software engineering principles, processes, tools and techniques for analysing and managing complex software projects.

INTENDED LEARNING OUTCOMES

- Select appropriate software engineering processes and practices for specific software engineering projects
- Manage team dynamics and professional communication
- Plan and manage projects
- Identify risks and modify project activities to mitigate these risks
- Manage software project activities to ensure a quality product
- Describe human and organisational implications of change and explain the organisational change process.

GENERIC SKILLS

- In-depth knowledge project management areas of knowledge
- Reach a high level of achievement in writing, research or project activities problem-solving and communication through the writing of project analyses
- Ability to function effectively as an individual and in a multidisciplinary and multi-cultural team as a leader, manager or effective team-member
- Understand and respect ethics and intellectual integrity
- Writing and communication skills.

LECTURES

- attend
- available via LMS

***Tutorials Start
Monday 11th
March 2019***

TUTORIALS / WORKSHOPS

- Student are expected to attend one one-hour workshop/tutorial each week.
- Workshops are intended to take concepts and principles discussed in lectures and to apply them to realistic examples.
- Students are expected to actively engage in workshops and show initiative, ask questions, conduct workshop exercises and in engage in the discussions

PLAGERISM AND COLLUSION

- submissions must be own independent work or group project work.
- faculty policy: mechanisms for establishing contributions of individuals to group work
- university policy: see <http://academichonesty.unimelb.edu.au/policy.html>
- if plagiarism or collusion is detected, harsh penalties must and will be applied



- **Subject feedback in Semester 2 2018 was mostly positive, with a few suggestions for improvement.**
- **Following are some of the changes we have done this semester based on the feedback from last semester.**

1. Lectures

- A better lecture theatre
- Make the lectures more interactive
- Regular practice problems/quiz to test our understanding

2. Tutorials

- Make the tutorials more activity based

3. Assignments

- Assignment 1 was too hard and marking was inconsistent across tutors

Assignments

Assignment	Due Date	Weighting
Assignment One - Individual	11.59pm Friday 5 th April (Week 5)	20%
Assignment Two - Group	Part 1: 11.59pm Wednesday 24 th April (Non-teaching Week) Part 2: 11.59pm Saturday 11 th May (Week 9) Part 3: 11.59pm Saturday 18 th May (Week 10) Part 4 FINAL: 11.59pm Saturday 25 th May (Week 11) Demonstration: During Week 12 Tutorials	30%

- Week 4 tutorial (week starting 25th March) - Groups for Assignment 2 will be allocated - **attendance is mandatory**
- 50% hurdle on the assignments one and two combined

Exam

- 2 hour written closed book end of semester – Weighting 50%
- 50% hurdle on the final exam



Assignment 1 - Learning Outcomes:

Analysis of an IT project case study that will demonstrate the ability to:

- identify the goals of the project;
- identify the key characteristics for the project;
- identify the risks in the project as identified at the start of the project; and
- justify the choice of a suitable software development lifecycle (SDLC) model to manage the project.



Assignment 1:

- Assignment specification will be given out by the end of week 2 – due Friday week 5
- You are expected to spend ~20-30 hours
- You will answer a set of questions related to a given case study
- Will be based on the material covered in weeks 1-4



Assignment 2 - Learning Outcomes:

A web-based IT system development project that will demonstrate the ability to:

- develop a Project Management Plan (PMP) for a given project brief;
- plan the activities involved in the chosen process;
- execute, monitor and control processes to achieve an outcome; and
- work effectively in a team.



Assignment 2

- Teams:
 - We will organise teams of 3-4 members during week 4 – teams will not be self-selected
 - Week 4 workshop attendance is mandatory as we will be selecting teams
 - Each student is expected to spend 30-40 hours on the project
- As a team you will be developing a web-based software system, which you will plan and manage:
 - You can choose any technology or framework including third party hosted systems such as Wix or simple web development frameworks such as WordPress
 - If you have not done the foundation subjects in your degree (or have received credit for them) please consider doing this subject next semester, after you complete the foundation subjects



Semester Structure

Week #	Lecture Date	Lecture Law G15 – Thursday 9.00am to 11.00am	Assignment
1	04/03/19	Subject Introduction, Introduction to Projects and Project Management,	
2	11/03/19	Project Management Plan & SDLC's	Assignment 1 Spec available on LMS 15/3
3	18/03/19	SDLC - Agile Scrum – continued Individuals, Motivation and Teams	
4	25/03/19	Stakeholder Management Communication Management	Assignment 2 available & Groups created during the workshops / tutorials – attendance mandatory
5	01/04/19	Project Planning and Scheduling Assignment 1 & 2 open forum / discussion	Assignment 1 (Individual) due Fri 5/4 @ 11.59 pm
6	08/04/19	Cost Estimation	
7	15/04/19	Risk Management	
	22/04/19	Non Teaching Week – Mid semester break	Assignment 2 (Part 1) due Wed 24/4 @ 11.59 pm
8	29/04/19	Quality Management	
9	06/05/19	Configuration Management (including guest lecture)	Assignment 2 (Part 2) due Sat 11/5 @ 11.59 pm
10	13/05/19	Ethics, Outsourcing & Procurement	Assignment 2 (Part 3) due Sat 18/5 @ 11.59 pm
11	20/05/19	Guest Lecture	Assignment 2 (Final) due Sat 25/5 @ 11.59 pm
12	20/05/19	Subject Revision and Exam Prep	Assignment 2 Project Demonstration during tutorials




L1 – Intended Learning Objectives

1. ~~Get to know your teaching staff, subject learning objectives, subject content and semester structure.~~
2. Understand key elements of a Project and why organisations use them.
3. Understand the foundational components of Project Management.
4. Understand key skills and responsibilities / activities of a Project Manager.
5. An initial look at (some) Project Management Methodologies / Standards.

L1.2 – What is a Project

A temporary endeavour to create a unique product, service or outcome.

Key characteristics:

- Introduce **CHANGE** to the organisation
- **TEMPORARY**, it has a defined beginning and end
- **CROSS-FUNCTIONAL**, cuts across organisational boundaries
- Deals with the **UNKNOWN**
- **UNIQUE**
- They all vary in **SIZE** –  /  , \$'s and 

L1.2 – Why do organisations use Projects

- Provides strategic alignment of key activities and visibility at the appropriate levels
- Mechanism to prioritise activities (Benefits, Regulatory, HW Refresh)
- Allows organisations to deliver change in a structured and formal manner outside of BAU
- Effective and efficient management of organisations limited resources (people & \$'s)
- Establish ownership and accountability – Process and the Benefits
- Provide clarity, buy-in and agreement across what will be done, when, who, why and the outcomes

www.pmi.org/about/learn-about-pmi/what-is-project-management

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L1.3 – What is Project Management

Project Management is the planning, delegating, monitoring and controlling of all aspects of the project, and motivating those involved to achieve the project objectives within the expected targets for time, costs, quality, scope, benefits and risks.

Value lies in:

- Organising and structuring scarce resources
- Managing risk
- Identifying and clearing issues
- Managing and implementing change
- Retaining and re-using knowledge
- Organisational wide learning from past success and failures

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L1.4 – Project Manager Skills / Attributes

Project managers are highly skilled knowledge workers and change agents. They take accountability, make project goals their own and use their skills and expertise to inspire a sense of shared purpose across the project team. They enjoy the organised adrenaline of new challenges and the responsibility of driving business results.

Core Skills / Attributes:

- Work well under pressure
- Comfortable with change and complexity in changing environments
- Use / have the right people skills
- Adapt, resolve issues and deal with problems
- Effective communicators regardless of hierarchy
- Action orientated and leave nothing for tomorrow
- Command & Control
- ***Good ones are in demand, hard to find and get paid a lot***

www.pmi.org/about/learn-about-pmi/who-are-project-managers

L1.4 – Project Manager Key Activities (traditional)

Planning

- Define and clarify project scope
- Develop the project management plan
- Develop the project schedule
- Develop policies and procedures to support the achievement of the project objectives

Organising

- Determine the project team structure
- Identify roles and responsibilities
- Identify services to be provided by external companies
- Staff all project positions and on-going management

Leading

- Setting team direction
- Owning & coordinating activities across different organisational functions
- Motivating team members
- Assigning work

Controlling

- Defining project baselines
- Tracking project progress
- Project status reporting
- Determining and taking corrective actions

L1.4 – Agile - Scrum Master Key Activities “a *change is occurring*”

Agile is redefining the way we execute projects and the role of the PM. In Agile:

- No defined PM role
- Key activities are spread / shared across team members
 - Key project activities are still undertaken formally with appropriate documentation
- Some alignment to activities of a Scrum Master to a Project Manager
- Move from Command and Control to Servant Leadership
 - Coaches and facilitates teams to deliver
 - Emphasises objectives
 - Is invested in the program's overall performance
 - Asks the teams for answers
 - Allows the teams to self-organise and hit their stride
 - Assists others with fixing issues

www.pmi.org/learning/library/pm-role-lean-agile-world-9350

www.greenleaf.org/what-is-servant-leadership/

<https://www.mountangoatsoftware.com/agile/agile-project-management>

L1.4 – Project Manager Key Activities - Market wants it all!

Project Manager Job Ad - Skills and experience

- Minimum 8+ years of experience as a Project Manager managing large, complex projects with multi-functional teams
- Strong stakeholder and relationship management skills
- Experience in managing multi-vendor teams
- Experience and qualifications in Prince2
- Can deal with complexity with very solid Project Management technical skills such as ability to develop and manage schedules, financial workbooks
- Strong stakeholder partnership skills, ability to work with teams at varying levels of project experience
- **Key requirement** is knowledge of **multiple models** of technical project delivery such as **agile and running sprints** but **equally** able to build confidence with the steering committee with **formal project management** approaches such as **setting** and achieving **deadlines** on timing and scope

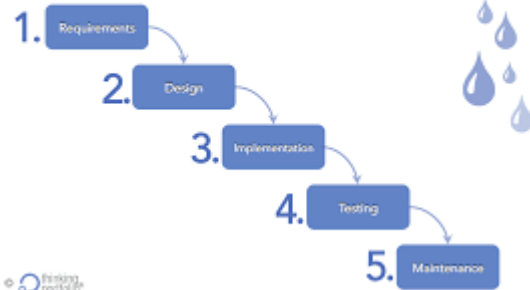
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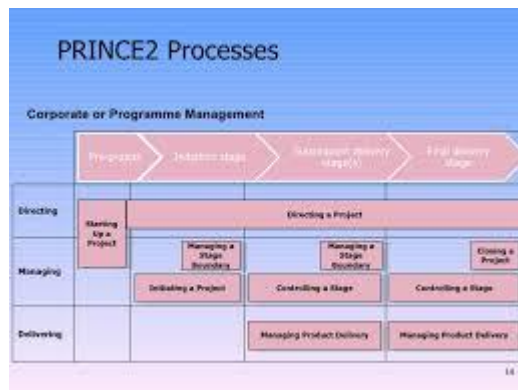
L1.5 – Project Management Methodologies / Standards

Waterfall

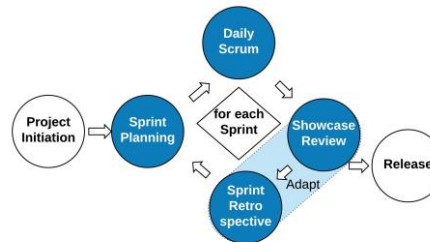
Project Waterfall Method



Prince2



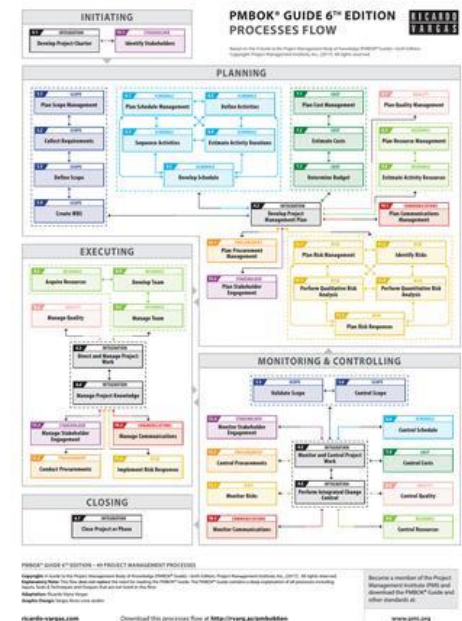
SCRUM



Agile



PMBOK



L1.5 – Key Elements of Project Management Methodologies / Standards

Waterfall

- Traditional approach used for over 40 years
- Requirements must be defined at the start
- Little / no alternations
- Sequential - Complete 1 task and then the next
- Used in large scale SW development where thorough planning and predictability is required

Pros

- Extensive planning, this thoroughness often results in more accurate timelines and budgets

Cons

- Difficult to apply changes or modify / correct previous steps (water can't run backwards), need to be proactive in anticipating problems

L1.5 – Key Elements of Project Management Methodologies / Standards

Agile

- Focuses on adapting to changing situations
- Reliant on constant and regular feedback
- Focuses on iterative outcomes delivering value as quickly as possible & collaboratively
- Small manageable actions and activities
- Involvement & ownership across the team – Team members self select work
- Customer focus over formalised sign-offs

Pros

- Retains flexibility while continually producing outcomes – less rework
- Greater communication & engagement – increased buy in across the team of the end outcome

Cons

- Difficult to do without experience – especially an experienced Scrum Master
- Large projects co-location a problem
- Difficult to contract suppliers

L1.5 – Key Elements of Project Management Methodologies / Standards

PRINCE2

- Government backed and endorsed (UK 1997)
- Widely used and accepted - Consulting, Private and Government
- Process orientated approach
- Divides projects into multiple stages
- Detailed and thorough
- Must have a clear need, a target customer, realistic benefits, and a thorough cost analysis

Pros

- Extensive documentation is helpful with corporate planning & tracking

Cons

- Difficult and untimely to adapt changes and apply these to all documentation

L1.5 – Key Elements of Project Management Methodologies / Standards

PMBOK – Project Management Body of Knowledge

- Is it a methodology or a standard? It doesn't matter as it is useful
- Analyse and plan future activities in detail
- Substantial and detailed frameworks
- Rigorous control
- Clearly defined roles
- Clear and validated deliverables

Pros

- Extensive tools, techniques and supporting templates to manage, monitor and control projects

Cons

- Limits decision making to the project managers – they become the primary decision maker
- Complex for small projects
- Difficult and untimely to adapt changes and apply these to all documentation

L1.5 – Project Methodologies – Which one is the right one?

- They all have a place and all can be appropriate
- It is like selecting the best recipe – *it all depends on your ingredients*
- Items (ingredients) to consider include:
 - Clarity and stability of scope
 - Timelines
 - Tools to support / drive the process
 - People / knowledge
 - Organisational maturity
 - Stakeholder buy-in
 - Experience in the various approaches

BREAK

Please return promptly as the
Lecture will re-start in **10 mins**

L1 – Intended Learning Objectives

6. Explore the key drivers of why projects fail / succeed.
7. Understand how organisations select the best / right projects (Project Screening).
8. Understand the Project Initialization process, Business Case structure and why organisations use them.
9. Explore various investment techniques and financial models.
10. Understand responsibilities associated with building a Business Case and the accountable group / individual.
11. Understand what a Project Charter is and how it is used.

L1.6 – Project Success / Failure – You decide

Failure or Success?

- Original estimate
 - \$1.2m
 - 12 months
- Final outcomes
 - \$2m (60% increase)
 - 18 months (50% longer)

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Failure or Success?

- Original estimate
 - \$1.2m
 - 12 months
- Final outcomes
 - \$2m (60% increase)
 - 18 months (50% longer)

Failure or Success?

- Original estimate
 - \$742m
 - 2 years
- Final outcomes
 - \$1.5bn (more than double)
 - 8+ years and still going....

L1.6 – Project Success / Failure – You decide

Failure or Success?

- Original estimate
 - \$1.2m
 - 12 months
- Final outcomes
 - \$2m (60% increase)
 - 18 months (50% longer)

Failure or Success?

- Original estimate
 - \$742m
 - 2 years
- Final outcomes
 - \$1.5bn (more than double)
 - 8+ years and still going....

L1.6 – Project Success / Failure – You decide

Failure or Success?

- Original estimate
 - \$7m
 - 6 years
- Final outcomes
 - \$102m (1,357% more)
 - 16 years (10 years longer)

L1.6 – Project Success / Failure – You decide

Failure or Success?

- Original estimate
 - \$7m
 - 6 years
- Final outcomes
 - \$102m (1,357% more)
 - 16 years (10 years longer)

L1.6 – Software Projects

History tells us we have failed.

	ALL IT PROJECTS				
	2011	2012	2013	2014	2015
Successful	29%	27%	31%	28%	29%
Challenged	49%	56%	50%	55%	52%
Failed	22%	17%	19%	17%	19%

- **Successful:** project is completed on-time and on-budget, with all features and functions as initially specified.
- **Challenged:** completed and operational but over-budget, over the time estimate or offers fewer features and functions than planned.
- **Failed:** project is cancelled at some point during the development cycle.

Standish Group Chaos Reports: Source: Standish Group 2015 Chaos Report www.projectsmart.co.uk/white-papers/chaos-report.pdf

L1.6 – Software Projects. What determines success?

Success Factors	%
1. Executive Sponsorship	15%
2. Emotional Maturity	15%
3. User Involvement	15%
4. Optimisation – Statement of Requirements	15%
5. Skilled Resources	10%
6. Standard Architecture	8%
7. Agile Process	7%
8. Modest Execution	6%
9. Project Management Expertise	5%
10. Clear Business Objectives	4%

- Factors have remained relatively constant
- If we know the reasons why can't we fix / improve it?
- 60% (first 4) are non technical items and difficult to change
- Broader organisational context and system at play

Standish Group Chaos Reports: www.projectsmart.co.uk/white-papers/chaos-report.pdf
www.infoq.com/articles/standish-chaos-2015

L1 – Intended Learning Objectives

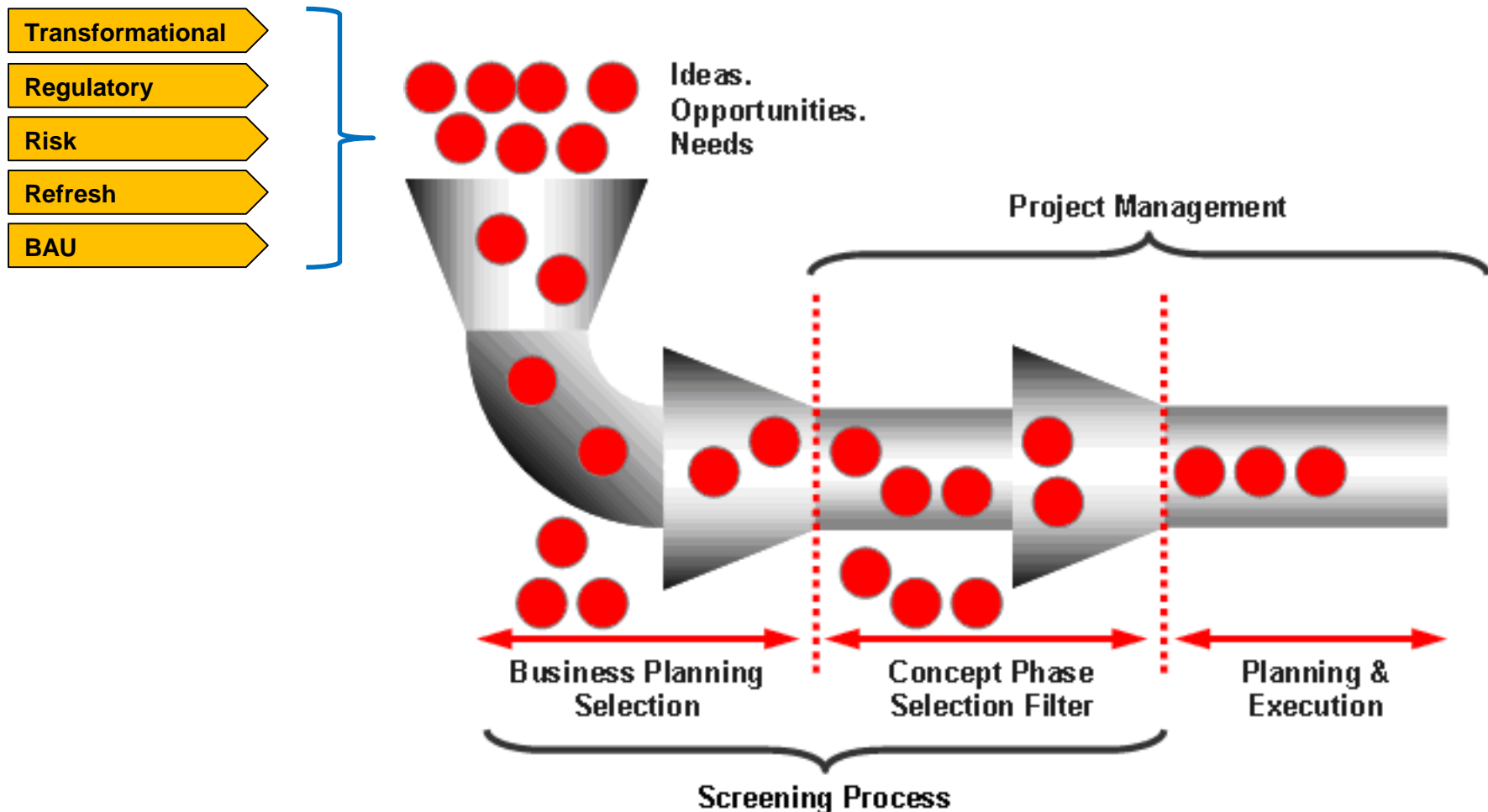
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L1.7 – Project Screening and where to start

“If you don’t know where your going any road will take you there”. Any Road by George Harrison – The Beatles

- The place to start is at the beginning!
- Organisations need a formal, structured approach to:
 - Select
 - Prioritise
 - Have oversight and
 - Drive accountability across all projects

L1.7 – Project Screening and where to start



L1 – Intended Learning Objectives

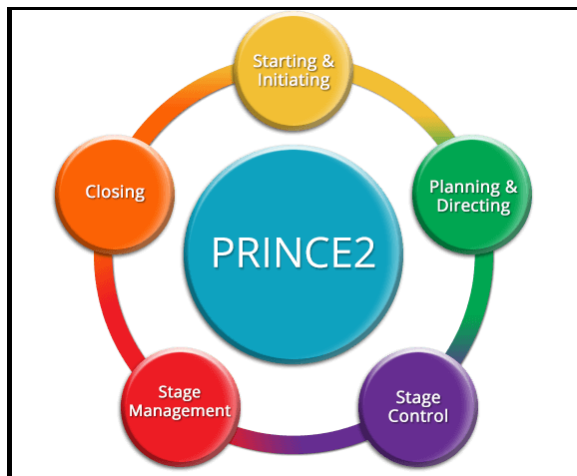
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L1.8 – Project Initialization

There are many approaches and methodologies that are widely used across industry with organisations favoring PRINCE2, PMBOK and Agile (or their own modified / best of breed version).

These (and all) have Pro's & Con's, we will use some of the key items from Prince2.

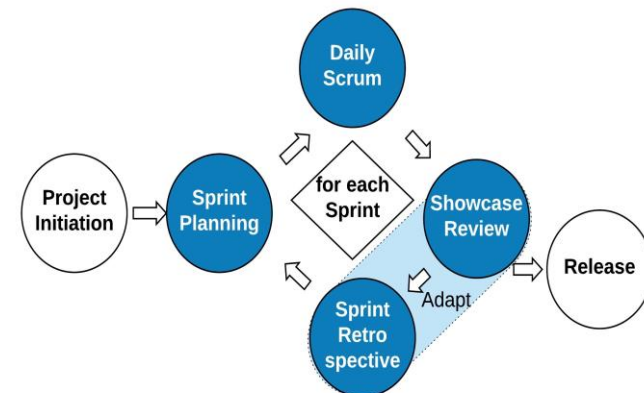
Prince2



PMBOK

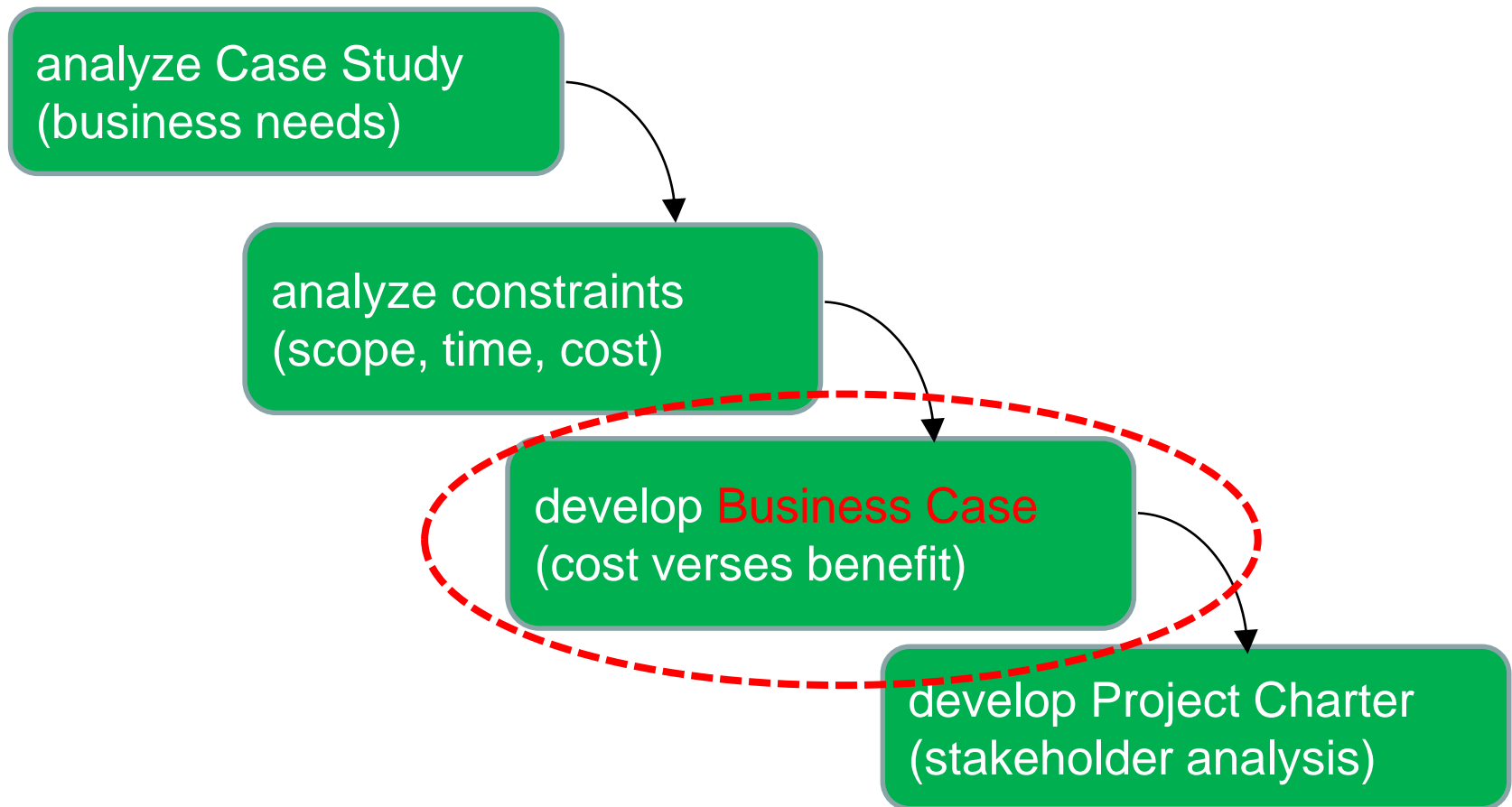


AGILE



L1.8 – Starting up a Project

The first *process: initialization*



L1.8 – Setting up a project for success. A Business Case is the key.

The purpose of the Business Case is to establish mechanisms to judge whether the project is (and remains) desirable, viable and achievable as a means to support decision making in its initial and continued investment.

- Provides a factual base for key decisions makers to decide if the project should be undertaken
- Demonstrates how the project adds value to the organisation
- Has a set of pre-defined standard organisational characteristics (costs, benefits, risk, etc.)
- It is not all about size - size depends on the cost / benefit
- It is a living document throughout the project that should be reviewed and signed off at key stages

L1.8 – Setting up a project for success. The Business case is key

Business case contains:

- Executive summary
- Reasons / explanation of why it is required
- Business options
- Expected benefits
- Expected dis-benefits
- Timescale
- Costs
- Investment appraisal
- Major risks

Source: www.prince2.com

L1 – Intended Learning Objectives

- ~~6. Explore the key drivers of why projects fail / succeed.~~
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L1.9 – It is all about the money!

- For non mandatory projects, the primary benefit is financial
- Multiple investment techniques are used to analyse the investment required / financial benefit
- Some (there are many more) techniques include:
 - Return On Investment
 - Net Present Value
 - Payback period
 - Rough Order of Magnitude
- However, it is not always about the best return – organisations need to invest in all parts of their business

L1.9 – Investment Techniques – Return On Investment (ROI)

- ROI is income divided by investment
 - $ROI = (\text{total discounted benefits} - \text{total discounted costs}) / \text{total discounted costs}$
- The higher the ROI % or higher the ratio of benefits to costs, the better it is
- Many organisations have a required rate of return or minimum acceptable rate of return on investment for projects (11% to 14%)

L1.9 – Investment Techniques – Net Present Value (NPV)

- NPV is one of the most often used quantitative/financial models for project selection
- NPV is a method of calculating the expected net monetary gain or loss from an investment (project) by discounting all future costs and benefits to the present time
- Projects with a positive NPV should be considered if financial value is a key criterion
- Generally, the higher the NPV, the more favourable a project is

L1.9 – Investment Techniques – Payback period

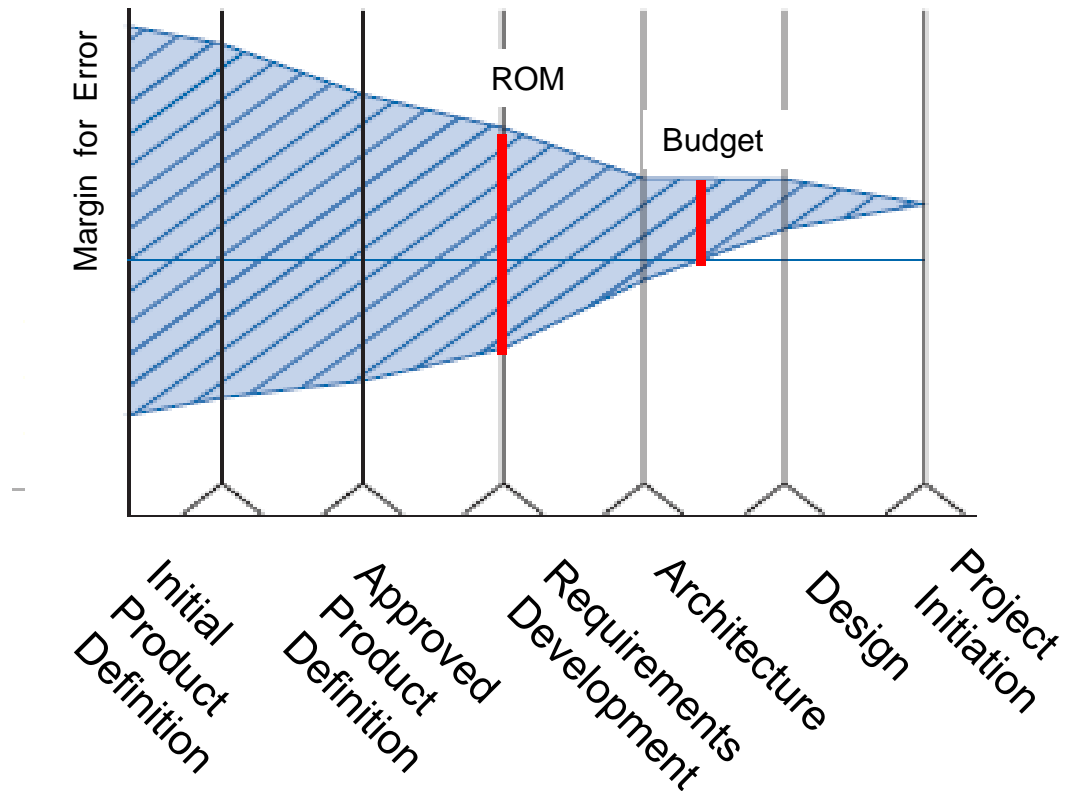
- The payback period is the amount of time it takes a project before the accrued benefits surpass accrued costs or how much time an investment takes to recover its initial cost
- Based on tracking the net cash flow across each year to determine the year that net benefits overtake net costs (not discounted cash flows)
- Many organizations want IT projects to have a fairly short payback period (< 1 year) due to the changing nature of technology

L1.9 – Investment Techniques – Project Estimation Rough Order of Magnitude (ROM)

The ***Cone of Uncertainty***
for cost estimates

Limited accuracy

- ROM: -25% ... +75%
- Budget: -10% ... +25%



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L1.10 - Business Case. Who's is responsible for what?

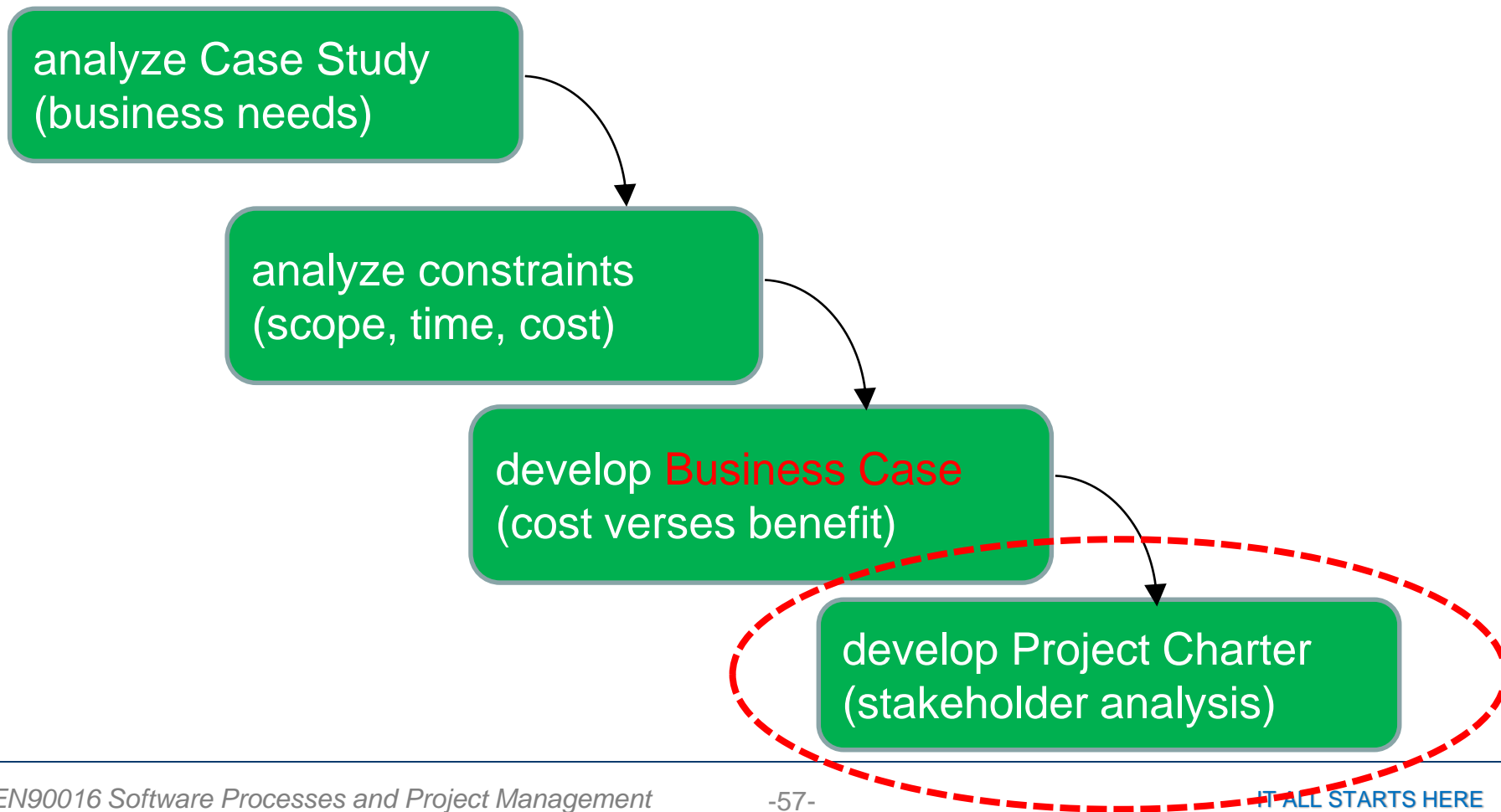
Role	Responsibilities
Corporate	<ol style="list-style-type: none"> 1. Provides Mandate / The go ahead. 2. Holds Senior Users accountable for benefits realisation. 3. Responsible for conducting post projects benefits validation.
Executive / Sponsor	<ol style="list-style-type: none"> 1. Owns the Business Case. 2. Responsible for reviewing the benefits throughout the project.
Senior Users	<ol style="list-style-type: none"> 1. Responsible for accepting the benefits and delivering them. 2. Responsible for ensuring the delivered products are to the appropriate quality standard. 3. Provides on-going actual V forecasted benefit realisation.
Project Manager	<ol style="list-style-type: none"> 1. Prepares the Business Case. 2. Conducts Risk assessment and impact analysis. 3. Assess and updates the Business Case at each defined stage.
Project Assurance / QA	<ol style="list-style-type: none"> 1. Assists in developing the Business Case. 2. Ensure value for money and risks are continuously managed. 3. Monitors change to the Business Case and validates it.
Project Support	<ol style="list-style-type: none"> 1. Responsible for capturing data and preparing management reports. 2. Key support point for all project stakeholders – schedules, cost analysis, minutes, actions, supplier liaison etc.

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L1.11 – Starting up a Project – Project Charter

The first *process: initialization*



Project Name

Target Date: [Date]

Project Description

Write out the project description here. Write out the project description here. Write out the project description here. Write out the project description here. Write out the project description here. Write out the project description here.

Costs	Item	Quantity	Rate	Total
	Resources			
	Equipment			
	Budget			
	Total			

Gains	Item	Quantity	Rate	Total
	Cost Savings			
	Time Savings			
	Revenue Gain			
	Net Total			

Project Team

- Person 1 – Project Manager
- Person 2 – Team Lead
- Person 3 – Analyst
- Person 4 – Developer
- Person 5 – Quality
- Person 6 – Trainer
- Person 7 – Other
- Person 8 – Other
- Person 9 – Other
- Person 10 – Other

Milestone 1

[Date]

[Description of what will be accomplished on this milestone]

Milestone 2

[Date]

[Description of what will be accomplished on this milestone]

Milestone 3

[Date]

[Description of what will be accomplished on this milestone]

L1 – Intended Learning Objectives

1. Get to know your teaching staff, subject learning objectives, subject content and semester structure.
2. Understand key elements of a Project and why organisations use them.
3. Understand the foundational components of Project Management.
4. Understand key skills and responsibilities / activities of a Project Manager.
5. An initial look at (some) Project Management Methodologies / Standards.

L1 – Intended Learning Objectives

6. Explore the key drivers of why projects fail / succeed.
7. Understand how organisations select the best / right projects (Project Screening).
8. Understand the Project Initialization process, Business Case structure and why organisations use them.
9. Explore various investment techniques and financial models.
10. Understand responsibilities associated with building a Business Case and the accountable group / individual.
11. Understand what a Project Charter is and how it is used.